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ABSTRACT

This paper considers three clinical judgment biases in clinical inference: (1) illusory correlation bias, the report by clinicians of a correlation between psychodiagnostic test signs and patient's symptoms which are not correlated or are correlated to a smaller degree than that reported; (2) labeling bias, the tendency of exposure to diagnositc labels to influence clinician's inferences about patients in such a way as to confirm the original label in the clinician's diagnosis; and (3) therapy outcome bias, the clinicians' belief that therapeutic techniques toward which they are favorably predisposed are more effective in remediating patients' symptoms than are alternative treatment strategies, even when research has shown that their favored strategies have no advantage over alternative therapies. Alloy and Tabachnik's theoretical model for understanding people's covariation assessments is applied to clinicians' diagnostic and therapy decisions in an attempt to formulate a covariation perspective for understanding clinical judgments. Evidence is presented which demonstrates that clinicians' judgments are influenced jointly by expectations and situational information. It is argued that often when covariation judgments go awry, they have been biased by clinicians' a priori expectations. The implications of the illusory correlation, labeling, and therapy outcome biases for clinical practice are considered, and the issues of accuracy, rationality, and utility in evaluating the impact of such biases are discussed. Possible strategies for debiasing inaccurate diagnostic and therapeutic inferences are suggested. (NRB)

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Psychodiagnostic and Psychotherapeutic Judgments: Expectation-based Biases in Covariation Assessment

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Psychodiagnostic and Psychotherapeutic Judgments: Expectation-based Biases in Covariation Assessment

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It is well known that clinical judgments are sometimes characterized by bias and distortion. Three particular biases that have been identified in clinical inference include: illusory correlation bias (e.g., Chapman & Chapman, 1967, 1969), labeling bias (e.g., Temerlin, 1968; Langer & Abelson, 1974), and therapy outcome bias (e.g., Kayne & Alloy, in press). Illusory correlation bias refers to the report by clinicians and naive observers of a correlation between psychodiagnostic test signs and patients' symptoms which, in reality, are not correlated or are correlated to a smaller degree than that reported. Labeling bias is the tendency of exposure to diagnostic labels to influence clinicians' inferences about patients in such a way as to confirm the original label in the clinicians' ultimate diagnoses. Therapy outcome bias refers to clinicians' belief that therapeutic techniques toward which they are favorably predisposed are more effective in remediating patients' symptoms than are alternative treatment strategies, yet well-controlled comparison experiments often show that their favored strategies have no advantage over alternative therapies.

What do these clinical judgment biases have in common? I argue that they are all instances of erroneous or distorted covariation assessments. Consequently, I apply a recent theoretical model for understanding people's covariation assessments in general (Alloy & Tabachnik, 1984) to clinicians' diagnostic and therapy decisions in particular in an attempt to formulate a covariation perspective for understanding clinical judgments. In so doing, I examine the extent to which clinicians' diagnostic and therapy outcome

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decisions are based on objective covariation information encountered in the clinic versus their preconceptions about the relationships between clinically significant features of patients and therapy. I present evidence from the experimental laboratory and the clinic demonstrating that both processes are involved and that clinicians' judgments are influenced jointly by expectations and situational information. However, I argue that when covariation judgments go awry, as in the three types of biases described above, it is usually because they have been biased by clinicians' a priori expectations.

In addition, I consider the implications of the illusory correlation, labeling, and therapy outcome biases for actual clinical practice and discuss the issues of accuracy, rationality, and utility in evaluating the impact of such biases. I suggest that expectation-biased clinical judgments are not necessarily less accurate than expectation-free decisions and may sometimes be quite appropriate and functional. Finally, I suggest possible strategies for debiasing diagnostic and therapeutic inferences when they are likely to be inaccurate.

Psychodiagnostic and Psychotherapeutic Judgments: Expectation-based Biases in Covariation Assessment

Consider the following three clinical judgment phenomena:

1) Many clinicians continue to use and report great confidence in certain psychodiagnostic tests as an aid to classifying patients despite the fact that the validity of these instruments has consistently been demonstrated to be low or nonexistent (cf. Chapman & Chapman, 1967; 1969). Treatment programs are often based, then, on the diagnoses derived, in part, from these tests.

2) Psychiatrists, clinical psychologists, and graduate students in clinical psychology who listened to a tape-recorded interview of a normal man tended to diagnose this man as psychotic if told that a prestigious person in their field had said "the patient looks neurotic but actually is quite psychotic" (Temerlin, 1968, p. 350).

3) Psychotherapy outcome studies in which the assessment of therapeutic outcome is likely to be biased (e.g., is conducted by raters who are not blind to treatment condition) tend to find that the favored therapy works best. In contrast, those studies with unbiased assessment of therapy outcome are likely to show no differences between the therapies compared.

Each of these phenomena may be quite familiar to those members of the audience in clinical psychology. The first is an example of what Chapman and Chapman (1967; 1969) have termed "illusory correlation": the report by clinicians and naive observers of a correlation between psychodiagnostic test signs and patients' symptoms which, in reality, are not correlated or are correlated to a smaller degree than that reported. The next example is an instance of "labeling bias." Exposure to the general label "patient", or to

more specific diagnostic labels such as "psychotic" or "schizophrenic", tends to influence a clinician's inferences about a patient in such a way as to confirm the original label in the clinician's ultimate diagnosis. The final example illustrates a phenomenon that might be called "therapy outcome bias." Practicing clinicians generally believe that therapeutic techniques toward which they are favorably predisposed are more effective in remediating patients' symptoms than are alternative treatment strategies. Yet, when well-controlled comparison experiments are conducted, their favored strategies often show no advantage over alternative therapies.

What do these clinical judgment phenomena have in common? I believe they are all instances of erroneous or biased covariation assessments. A covariation refers to the relationship between two events and may be defined in terms of their co-occurrence, that is, the degree to which one event occurs more often in the presence than in the absence of the other event. Assessments of covariation comprise an important component of many of the clinician's decisions. To diagnose a patient, for example, the clinician must be able to accurately detect which symptoms covary together, which symptoms are associated with which diagnostic categories, and if using psychological tests, which test responses are related to which pathologies. Consideration of the illusory correlation and labeling biases suggests that such judgments are often in error and can lead to interventions for psychiatric patients based on faulty or incomplete diagnoses. Such psychodiagnostic decisions sometimes reveal more about the clinician's hypotheses or preconceptions of psychopathology than about the actual status of the patient. As a psychotherapist, the clinician must judge the covariation between different treatment strategies and therapeutic outcome in order to determine the relative effectiveness of various interventions. The phenomenon of therapy

outcome bias suggests that clinicians' assessments of therapeutic effectiveness are not based solely on objective data but are also influenced by their general expectations or theories about psychotherapy.

In the remainder of my talk, I will describe a recent theoretical framework for organizing and understanding people's and animals' covariation assessments in general and will very briefly review empirical work on covariation perception in light of this framework. Next, I will apply our framework to the three biases in clinical inference with which I began: illusory correlation bias, labeling bias, and therapy outcome bias. In so doing, I argue that clinicians' diagnostic and therapy outcome decisions are a function of both objective covariation information encountered in the clinic and clinicians' preconceptions about the relationships between significant features of patients. However, when such decisions go awry, as in the three types of clinical judgment biases, it is usually because they have been biased by strong a priori expectations or beliefs.

An Expectation by Situational Information Interactional Framework for Covariation Assessment

Recently, Alloy and Tabachnik (1984) proposed a theoretical framework for understanding and integrating people's and animals' covariation assessments. We argued that two sources of information jointly determine covariation perception: the situational information about the objective contingency between the events provided by the current environment and the organism's prior expectations or beliefs about the event covariation in question. The degree to which any particular subjective judgment of covariation matches the objective contingency between events represented in the environment (i.e., is accurate) depends on the relative strength of prior expectations and current situational information. The concept of expectation strength refers to the

degree to which the organism holds extant beliefs about the nature of the event covariation in question. Such expectations may arise either from prior direct experience with the events in similar situations or from other indirect sources (e.g., cultural transmission, biological predispositions). The concept of strength of situational information refers to the relative availability to the organism of information about event relationships in the present environment. Current situational information can be unavailable or weak because it is insufficient in quantity to support a covariation perception (e.g., the organism has had little experience with the events in the current situation) and/or because it is ambiguous (e.g., it is not very diagnostic).

Table 1 summarizes the interaction between prior expectations and current situational information in determining covariation perception and provides the theoretical framework I will use to organize and explain the clinical judgment findings. The cells of Table 1 (cf. Alloy & Tabachnik, 1984) are formed by

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Insert Table 1 about here

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considering the four possible combinations of low versus high strength of prior expectations and low versus high strength of current situational information.

In Cell 1 of Table 1, both situational information and prior expectations regarding the covariation between two events are weak. Under such conditions, people and animals should have great difficulty forming a perception of covariation, because they have very little information to go on at all. Thus, they should forgo making a covariation inference or make an inference with low

confidence, and the empirical evidence reviewed by Alloy and Tabachnik suggests that this is the case.

In Cell 2 of the table, the strength of prior expectations about an event covariation is high, although as in Cell 1, situational information is weak and provides relatively little support for any particular covariation perception. Under these conditions, covariation judgments are predicted to be direct reflections of a priori expectations. People and animals will be likely to form strong covariation perceptions in the face of weak evidence. The relative accuracy of such perceptions will depend on the accuracy or appropriateness of the individual's extant beliefs.

In Cell 3, available situational information about the covariation between two events is stronger than are prior expectations. In the absence of strong beliefs about the covariation in question, humans' or animals' perceptions should accurately reflect the objective contingency between the events represented in the environment.

Our review of the covariation judgement literature suggested that when people or animals are confronted with a Cell 3 situation, their covariation judgments are, indeed, more accurate than when they are faced with Cell 2 circumstances. For example, Jennings, Amabile, and Ross (1982) compared subjects' judgments of the relationship between pairs of stimuli (letters and musical note durations) for which they had no relevant expectations (Cell 3 of Table 1) and those for which they had strong preconceptions about the relationship between the events (two measures of honesty), but no situational covariation data (Cell 2 of Table 1). They found that covariation estimates for the data-based condition were, on the whole, quite sensitive to the actual correlation between the stimuli (although somewhat conservative); whereas the theory-based estimates in the absence of immediately available data often

represented large overestimations of the objective correlations between the stimuli.

Finally, Cell 4 represents the situation in which both expectations and situational information strongly and independently suggest a particular covariation perception. If a priori expectations and situational information are congruent (Case 1 of Cell 4), the organism is in a fortunate position. With a minimal amount of cognitive effort, he/she/it could make a covariation judgment with accuracy and extreme confidence and the evidence suggests that they do. If, however, generalized beliefs and situational information are incongruent and imply different perceptions of contingency (Case 2 of Cell 4), the perceiver is faced with a "cognitive dilemma" (Metalsky & Abramson, 1981). The person or animal could overlook current situational information and make a covariation judgment in line with prior expectations or ignore strongly held beliefs about the covariation in question in favor of the situational information instead. The empirical evidence we reviewed suggests that people and animals faced with this dilemma generally make covariation assessments biased in the direction of their initial expectations. For example, a number of studies have found that people detect event relationships that are congruent with their prior expectations about those relationships more accurately than expectation-inconsistent contingencies (e.g., Coppel & Smith, 1980; Crocker & Taylor, 1978; Dickinson, Shanks, & Evenden, 1984). However, a substantial amount of belief-contradictory evidence or particularly salient contradictory evidence can lead to covariation assessments pulled in the direction of current situational information. In other words, the relative strength of the two sources of information determine the nature and accuracy of the covariation perception.

The Covariation Judgment Process

According to a normative model of covariation assessment (Crocker, 1981), one must know the number of cases that fall into each cell of a 2 x 2 contingency table and use the information from all 4 cells in order to accurately determine the degree of covariation between two events (see Table 2). Cells a and d constitute confirming cases (i.e., cases that confirm there

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Insert Table 2 about here

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is a relationship between the two events, because when one of these events is absent, the other is also absent). Cells b and c constitute disconfirming cases (i.e., cases in which the relationship does not hold).

By what mechanisms do preconceptions about event relationships exert their influence on covariation judgments? A useful way of approaching the issue of mechanism is to consider the cognitive steps or processes that may lead to subjective estimates of contingency (Crocker, 1981). These processes may include: (1) deciding how much and what kinds of information are relevant to a particular covariation question (i.e., which cells of Table 2 are relevant); (2) sampling or selecting information from the total evidence available; (3) classifying selected instances as confirming or disconfirming cases; (4) recalling the instances and estimating the relative frequencies of confirming and disconfirming cases; and (5) combining the information obtained into a judgment. Basic research in cognitive and social psychology suggests that individuals' preconceptions can produce systematic biases in any of these cognitive processes and thus, lead to covariation judgments pulled in the direction of a priori expectations (see Alloy & Tabachnik, 1984 and Crocker, 1981).

Biases in Clinical Judgment

Given the theoretical framework I have outlined to understand people's covariation judgments in general, we are now better equipped to examine covariation judgments in the clinical setting.

Illusory correlation bias. Chapman and Chapman (1967) noted a problem of much concern for the field of clinical psychology: a persistent and systematic inaccuracy in psychodiagnosticians' assessments of test sign-symptom relationships. Despite a massive accumulation of evidence indicating that various diagnostic tests were invalid, that is, that there was no or minimal correlation between the results of these tests and patient symptomatology, many clinicians shared the opinion that identifiable characteristics of test performance were correlated with patient behavior.

In an attempt to understand the nature of such illusory correlation biases among diagnosticians, Chapman and Chapman (1967) presented naive subjects with a series of Draw-a-Person (DAP) pictures, each paired arbitrarily with a set of statements about the symptoms of the patient who allegedly drew the picture. After inspecting 45 pairings of drawings and symptom statements, subjects were asked to determine which DAP responses had been associated with particular patient characteristics. Naive subjects, on the basis of their observations of symptom statements paired noncontingently with patient characteristics, rediscovered illusory correlates that were virtually identical to those of clinicians surveyed earlier (see also Smedslund, 1963). Of particular interest is the additional finding that illusory correlates corresponded to people's a priori expectations about test-sign-symptom relationships (Chapman & Chapman, 1967, Experiment 3). Even when a group of subjects were not shown any stimulus materials but were asked about the relationship between test signs and symptom statements, their data-less

judgments closely resembled the judgments of clinicians and subjects who had been given an opportunity to carefully examine relevant data.

In an even more elegant series of studies than their first, Chapman and Chapman (1969) found that naive subjects who were given the opportunity to observe a random relationship between patient characteristics and Rorschach test signs, consistently underestimated the contingency between symptoms and clinically valid signs having a low degree of associative strength and consistently overestimated the relationship between symptoms and clinically invalid but popular test signs having a high degree of associative strength. Again, the illusory correlates reported by naive subjects corresponded to the invalid test signs that had previously been reported by clinicians.

It is possible to examine the work on illusory correlation in psychodiagnosis with respect to Table 1. Subjects in the typical illusory correlation experiment, and by implication, clinicians, are faced with a Cell 4 (i.e., Case 2 of Cell 4) cognitive dilemma. Whereas the situational information presented to subjects in test-sign-symptom pairings indicates that there is no relationship between any particular test sign and symptom, subjects have strong expectations that certain signs and symptoms are, in fact, associated. In most of the illusory correlation experiments, subjects seem to resolve this cognitive dilemma by interpreting or recalling the situational evidence in line with their prior beliefs. However, under conditions in which belief-inconsistent information is made more salient or compelling, although subjects still resolve their cognitive dilemmas in favor of their prior beliefs, their tendency to do so is greatly attenuated (see Alloy & Kayne, 1985, and Kayne & Alloy, in press, for a detailed discussion of covariation assessment in psychodiagnostic judgments). For example, when a negative correlation between invalid test signs and symptom statements or when

a highly positive correlation between valid test signs and symptom statements are built into the stimulus materials, illusory correlation bias is greatly reduced (Chapman & Chapman, 1967; 1969). Similarly, if subjects are allowed to organize the stimulus materials in a manner that makes the lack of correlation between test signs and symptoms more salient, expectation-biased judgments are smaller. Thus, it appears that consistent with our general covariation assessment theoretical framework, the illusory correlation bias is influenced jointly by both preconceptions and situational evidence.

Labeling bias. A second bias in clinical judgment is the "labeling bias": the tendency of a label-produced expectation to lead to diagnoses in line with the original label. Perhaps the most vivid and famous illustration of a labeling bias at work comes from Rosenhan's (1973) well-known pseudopatient study in which 8 normal people got themselves admitted to various psychiatric hospitals with the diagnosis of schizophrenia by faking auditory hallucinations. Once initially admitted with the label of schizophrenic, staff members continued to interpret much of the pseudopatients' subsequent "normal" behavior as pathological in line with the label and thus, confirmed the initial false diagnosis.

In an effort to examine the labeling bias phenomenon directly, Temerlin (1968) conducted an experiment in which psychiatrists, clinical psychologists and clinical psychology graduate students listened to and diagnosed a tape-recorded interview of an actor playing the part of a mentally healthy man. Shortly before listening to the interview, however, subjects in the experimental groups were told that a very prestigious person in their field had found this interview particularly interesting because "the patient looked neurotic but actually was quite psychotic" (Temerlin, 1968, p. 350). Control groups, matched for professional identity, did not receive this particular

prestige suggestion. Temerlin's results were quite compelling. Whereas not a single control subject reported that the interviewee was psychotic, 60% of the psychiatrists, 28% of the clinical psychologists and 11% of the graduate students given the prestige suggestion diagnosed psychosis. In addition, the clinicians were also asked to write brief clinical reports, delineating the behavioral basis of their diagnoses. It is interesting that only those subjects whose diagnoses were correct, i.e., only those who reported that the interviewee was mentally healthy, gave accurate behavioral descriptions. Despite instructions to the contrary, most subjects reported inferences in place of observations.

Temerlin's results may provide another example of expectation-biased covariation judgments in the clinic. That the prestige suggestion in this experiment caused subjects to expect psychosis (see Temerlin, 1968 for an explanation of the greater influence of prestige suggestion on psychiatrists than clinical psychologists and graduate students), and therefore biased their objective processing of the information available in the interview, seems to be a relatively straightforward conclusion. However, Temerlin's experiment allows us to go a step further than the experiments on illusory correlation, in examining the mechanisms underlying expectation-based biases. Temerlin presents evidence that those subjects who fell prey to the prestige suggestion did so at the level of encoding (i.e., process or step 3 above) by confusing expectation-based inferences with data-based observations. Thus, the belief that the interviewee was psychotic carried with it an expectation that particular "psychotic" behaviors would be observed. Subjects' encoding of the interviewee's behavior, then, may have been biased in the direction of their expectations, such that they interpreted ambiguous behaviors as indicative of psychosis.

Sushinsky and Wener (1975) extended Temerlin's findings and raise two points of interest for my talk. First, undergraduates asked to rate the pathology evident in a tape of a normal man (modeled after the one used by Temerlin) versus a tape of an actual clinical interview with a hospitalized, nonpsychotic psychiatric patient, rated the psychiatric patient as more pathological than the normal individual, regardless of the prestige suggestion that they had received. The fact that subjects were sensitive to the objective level of pathology portrayed in the tapes indicates that the labeling bias phenomenon, similar to the illusory correlation effect, is best conceptualized as an interaction between data-based and expectation-based processing, rather than a function of expectation-based processing alone. Second, subjects were given the prestige suggestion either before hearing the interview or after hearing the interview but immediately prior to making their ratings. Subjects' ratings did not differ significantly between the two conditions, thus eliminating the possibility that in this situation, labeling biases can be attributed to errors in data selection, data sampling, or encoding. Rather, such biases were presumably a function of distortions in data retrieval (a later step in the processing of information) or information conbinatorial processes. A consideration of many labeling bias experiments taken together (see Alloy & Kayne, 1985; Kayne & Alloy, in press) suggests that label-produced expectations may exert their influence at several stages of the covariation judgment process. When a label is presented before an individual observes relevant data, expectation-based biases may occur in data selection, sampling, encoding or recall; whereas when the label is presented after observation of relevant data, biases may be limited to memorial or response processes.

Therapy outcome bias. The covariation judgment process plays an important role not only in the clinician's task as diagnostician, but also in his or her other role as therapist. Periodically during the course of therapy (either explicitly or implicitly), a clinician will need to make assessments of the effectiveness of therapeutic techniques. The assessment of therapeutic effectiveness can be reduced to the following covariation question: To what extent does a particular treatment or do particular therapeutic strategies covary with desirable therapeutic outcomes? The source of the psychotherapist's expectation-based biases should be obvious. The practicing clinician has had years of formal education and clinical experience. Typically, by virtue of this experience the clinician has come to expect one or another type of treatment to be more successful than other types. In fact, even an eclectic therapist is likely to expect that eclectic therapy is most effective or that different types of therapies are most effective in different situations. Thus, we would predict that therapists will be prone to many of the cognitive distortions associated with prior expectations already discussed.

To date, I know of no studies that specifically address the issue of clinicians' expectation-based biases in assessment of therapeutic effectiveness. Kayne and I (Kayne & Alloy, in press) therefore decided to conduct a study of our own. As a starting point, we utilized Luborsky, Singer, and Luborsky's (1975) comprehensive review of comparative studies of psychotherapy. To make our own task more manageable, we decided to look at only those studies that compared individual psychotherapy to control groups and those that compared different kinds of individual psychotherapy (i.e., behavior therapy versus traditional psychotherapy and client-centered versus traditional). Our task involved tracking down every one of the studies in

these categories (of 37 studies we were able to locate 31), and carefully evaluating each to determine whether bias existed in the manner in which therapeutic outcome was assessed. For example, if the individuals who rated patient improvement were the same as those who conducted therapy (and sometimes even the same as the authors of the study), we concluded that there was high probability of biased assessment of therapeutic outcome. Conversely, if the individuals who rated patient improvement were blind to treatment, or if objective criteria such as discharge from the hospital (assuming staff were blind to treatment) were used, we concluded that assessment of therapeutic effectiveness was likely to be unbiased. In Table 3 is a box score of our findings.

Insert Table 3 about here

Studies were grouped into those showing evidence of biased assessment of outcome versus those showing no evidence of bias, and the number of each type in which the favored psychotherapy did better versus the number in which there was no difference between therapies being compared or in which the favored psychotherapy did worse was determined. There were two basic strategies we employed to determine which brand of psychotherapy was favored (and therefore, in which direction expectation-based errors should occur). In many cases, explicit statements in the text of the articles revealed which therapy was favored. In other cases, we determined the favored therapy on the basis of the authors' reputation. For example, in one study comparing behavior therapy to traditional therapy, the person who authored the study and conducted both types of psychotherapy was a noted behaviorist.

Notice that the data in Table 3 are markedly skewed, $X^2 = 4.5$, $p < .05$. Those studies with biased assessment of therapeutic outcome tend to find that

the favored therapy does better, whereas those studies with no evidence of bias are more likely to show no difference between the therapies compared. Our study suggests then, that clinicians' expectation-based biases in assessment of therapy outcome are as pervasive as their expectation-based biases in patient diagnosis. Indeed, Sloane et al. (1975) found that ratings of improvement made by therapists were only minimally correlated (r = .13) with ratings of therapeutic effectiveness made by unbiased sources, i.e., independent and blind assessors.

Implications of Expectation-biased Covariation Judgments for Clinical Practice

What are the implications of these expectation-based biases in decision-making for actual clinical practice? The importance of accurate diagnosis in the clinic cannot be overemphasized. Quite often the treatment for any particular patient will be chosen mainly on the basis of his or her clinical diagnosis. Likewise, the reactions of others in the patient's environment will be influenced strongly by his or her diagnosis. In addition, the accumulation of meaningful scientific knowledge about the characteristics and etiologies of particular psychopathologies depends on the accurate classification of patients into diagnostic categories. Consideration of the illusory correlation and labeling biases suggests that such judgments are often in error and can lead to inappropriate interventions for psychiatric patients or the accumulation of misleading scientific knowledge based on faulty or incomplete diagnoses. Further, the phenomenon of therapy outcome bias suggests that clinicians may persist in the use of particular treatment interventions because of a continued belief in their efficacy, despite the fact that these strategies may actually be ineffective or even harmful to some classes of patients.

Moreover, the naive subjects in the illusory correlation and labeling bias studies I described observed the diagnostic materials under conditions far more conducive to accurate detection of the objective contingencies than that usually faced by clinicians (Chapman & Chapman, 1967). For example, the practicing clinician may be reinforced in his or her detection of illusory correlates by similar observations of fellow clinicians. Yet, as the Chapmans' studies show, such "consensual validation" can often reflect shared systematic error rather than shared accuracy. In addition, in making judgments about the relationships between diagnostic test signs and patients' symptoms and between symptoms and diagnoses, clinicians typically must deal with a much larger number of symptoms over a substantially longer time interval than did the naive observers of the illusory correlation or labeling bias laboratory studies. Consequently, such biases are likely to be even more pervasive in the conventional clinical setting than in the experimental laboratory.

Although I have clearly emphasized the negative implications of expectation-based clinical judgment biases in my discussion thus far, it is important to point out that belief-based covariation assessments may provide benefits as well. Expectations or category labels provide a means by which the multiplicity of stimuli in the environment may be organized (Rosch, 1975; Rosch & Mervis, 1975). In addition to guiding the interpretation of currently available information, expectations direct attention to information that is likely to be relevant in the future. Along these lines, it may be both necessary and advantageous for clinicians to utilize general theories about psychopathology and specific expectations about individual patients in order to make sense of the bewildering array of patient behaviors with which they are confronted. Moreover, the bias to overweight prior expectations in the

covariation judgment process can increase the likelihood of accurate diagnoses if the initial expectations are themselves, veridical. Reliance on such expectations may allow the clinician to perceive and comprehend relevant behaviors that he or she would otherwise have not seen or understood. For example, if a professional colleague is, in fact, an expert on psychosis, knowledge that he or she has said that a particular individual "looks neurotic but actually is quite psychotic" can enhance accurate detection of the patient's psychosis by increasing attention to and memory for behaviors indicative of psychosis. The more general point is that the strategy of weighting preconceptions heavily in making covariation judgments, even when such expectations are at odds with current situational information, may be quite rational and useful, particularly when these preconceptions are themselves based on the accumulation of lots of past situational information (Alloy & Tabachnik, 1984). Ultimately, the determination of the rationality of clinician's covariation judgment processes may depend upon the development of a normative model of covariation assessment that provides appropriate weights for expectations and current information in different environmental contexts (Alloy & Tabachnik, 1984).

Strategies for Debiasing Expectation-based Clinical Judgments

Although expectation-biased covariation assessments in clinical inference may be rational and adaptive under some conditions, how might we correct illusory correlation, labeling, and therapy outcome biases when they are likely to lead to inaccurate judgments? Time does not permit me to describe specific debiasing techniques in any detail; however, an implication of the Alloy and Tabachnik (1984) covariation assessment framework is that two general types of remedial strategies should be effective: a strategy that increases the salience or diagnosticity of objective contingency information

in the current environment or one that decreases the strength or applicabiliity of preconceptions about the relationships of interest. In other words, our goal would be to increase clinician's abilities to make sense of their patients rather than impose sense on their patients.

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Table 1

The Role of Prior Expectations and Situational Information in the Covariation Assessment Process

The strength of prior expectations about the covariation between two events	The strength of current situational information about the covariation between two events: Low	The strength of current situational information about the covariation between two events: High
Low	Cell 1. A person or animal will refrain from making any causal attribution or covariation inference at all or will make a judgment with low confidence.	Cell 3. A person or animal will make a causal attribution or perceive covariation in line with the available situational information.
High	Cell 2. A person or animal will make a causal attribution or perceive covariation in line with his/her/its prior expectancies.	Cell 4. Case 1. Prior expectations and situational information imply the same causal attribution or covariation perception. A person or animal will make an attribution or perceive covariation with extreme confidence. Case 2. Prior expectations and situational information imply different causal attributions or covariation perceptions. A person or animal is in a cognitive dilemma (see text for ways in which a person or animal might solve this dilemma).

Note. Adapted from "Attributional styles: Toward a framework for conceptualization and assessment" by G.I. Metalsky and L. Y. Abramson. In Assessment strategies for cognitive-behavioral interventions edited by P.C. Kendall and S.D. Hollon, New York: Academic Press, 1981. Copyright 1981 by Academic Press. Adapted by permission.

Table 2

Four Types of Evidence Relevant to Judging the Covariation Between Two Events

	Event 1	
Event 2	Present	Absent
Present	a pos. conf. cases	b disconf. cases
Absent	c disconf. cases	d neg. conf. cases

Table 3

Box Score of Clinicians' Expectation-based Biases in Assessment of Psychotherapy Outcome

Assessment of Therapeutic Outcome	Therapy Outcome: Favored therapy shows greater improvement than alternative therapies or controls	Therapy Outcome: Favored therapy shows less or the same improvement as alternative therapies or controls
Evidence of biased assessment	Cell 1: 10	Cell 2: 3
Evidence of unbiased assessment	Cell 3: 6	Cell 4: 12

Note. Numbers in the table were derived from an examination of 31 psychotherapy outcome studies selected from those reviewed by Luborsky, Singer and Luborsky (1975). (See text for selection criteria.)